

amperes per cm^2 -sec. He finds the positive curvature constant and shows clearly that it is due to injury of the cells on the positive side. He does not find the negative curvature constant in any case, but observes that the positive curvature (which he calls normal) may be produced, even when the negative appears, by varying the strength and time of action of the current. This GASSNER confirmed, but he paid more attention to the negative curvature as the initial effect of very weak currents, and lays stress on it in identifying galvanotropism with traumatropism as an irritable phenomenon.

PLOWMAN ascribes the injury causing positive curvatures to positive electrons bombarding the side of root turned toward the anode (wherefore he prefers *electrotropism*). He specifically denies the influence of products of electrolysis. Negative electrons he finds innocuous and perhaps even stimulative. Thus his facts are mainly corroborated by GASSNER, but the two interpretations are quite different. GASSNER also seems to have entirely overlooked PLOWMAN's papers.—C. R. B.

Morphogenesis in *Ceratophyllum*.—A recent publication by the Carnegie Institution,¹⁸ under the authorship of Dr. PEARL and assistants, proves to be a contribution of unusual merit because of the masterly way in which the biometrical method has been applied to one of the most important but neglected problems of biology. Two laws of growth in *Ceratophyllum* have been formulated on the basis of convincing evidence. The first law is: "The mean number of leaves per whorl increases with each successive whorl, and in such a way that not only does the absolute increment in each leaf-number diminish, but also the rate of increase diminishes as the ordinal number of the whorl, measured from a fixed point, increases." The second law is: "As whorls are successively produced by a growing bud, they are formed with ever-increasing constancy to their type, the ultimate limit towards which the process is tending being absolute constancy." The significance of these laws and the field for physiological study suggested by them is far too great to be elaborated here and reference to the original is urged. The paper shows a clear scientific discernment and is a model of composition. It may safely be said that the Carnegie Institution has not wasted any money on this minor grant. The value of such a contribution as compared with its insignificant cost goes far toward compensating for the cost of other small grants which have proved less fruitful.—RAYMOND H. POND.

Relation of saprophytic fungi to the substratum.—Two papers have appeared dealing with the relation of some saprophytic fungi to their substratum. The first of these, by KRATZ,¹⁹ deals with pyrenomycetes growing on dead stems of herbaceous plants and on leaves. It consists mostly of brief categorical descrip-

¹⁸ PEARL, RAYMOND, with the assistance of OLIVE M. PEPPER and FLORENCE J. HAGLE, Variation and differentiation in *Ceratophyllum*. Pub. Carnegie Institution of Washington no. —. pp. 136. 1907.

¹⁹ KRANTZ, CARL VON, Ueber die Beziehungen der Mycelien einiger saprophytischer Pyrenomyceten zu ihrem Substrat. *Hedwigia* 46: 1-24. figs. 8. 1906.

tions of the fruit-bodies and mycelia of the fungi considered. The author attempts to distinguish form-types of perithecia according to their position on or their relation to the elements of the stem; for example, the perithecia originating under the sclerenchyma sheath are flattened, while those originating under the epidermis are round. That pressure from any cause will influence the form of perithecia is self-evident and of little importance. One general fact to be deduced from the paper is that the sclerenchyma tissue is not penetrated by the fungous hyphae.

The second paper, by DUYSEN,²⁰ deals with wood-inhabiting discomycetes. In this it is shown that the mycelium of many of these fungi, as *Helotium*, *Coryne*, *Mollisia*, and others, penetrates the cells only by the pits or by cracks and fissures caused by other agencies. Enzyme action here is apparently of less importance in aiding the hyphae to penetrate cell walls. In others, like *Propolis* and *Schizoxylon*, more or less of the wood is actually destroyed by enzymosis, mostly in the vicinity of the fruit-body. The sclerenchymatous tissue is not injured.—H. HASSELBRING.

A study in endemism.—Mount Ritigala is an isolated mountain in north-central Ceylon, within 100 feet of whose summit there occurs a remarkable flora, covering only a few acres. In this small space there exist species that belong to the flora of the wetter districts of Ceylon, a regular oasis of vegetation distinct from the dry country surrounding it. WILLIS²¹ has studied the possibilities of the origin of this isolated flora and its endemic forms. The number of species enumerated is 144, but 41 of these are eliminated as occurring also in the dry zone and so are not compelled to travel 40 miles to reach the summit. The 103 remaining species all belong to the moist region of Ceylon, at least 40 miles away. Of these species, 24 can be carried by birds, 49 by the wind, and the distribution methods of the remaining 30 are doubtful. After various analyses of the statistics, the conclusion is reached "that endemism, other things being equal, goes in general with difficulty of distribution, and with rare arrival in one spot." For example, the bird-carried forms arrive more regularly than the others, and there is one endemic form among the 24 species; the wind-carried forms arrive less regularly, and there are three endemic forms among the 49 species; while the plants whose method of distribution is called "doubtful" arrive most rarely, and there are 8 endemic forms out of 24 species, 6 of the 30 species being rejected for a special reason.—J. M. C.

Motor mechanism of Berberis stamens.—JUEL²² has made some interesting observations and experiments on the staminal filaments of *Berberis* and *Cen-*

²⁰ DUYSEN, FRANZ VON, Ueber die Beziehungen der Mycelien einiger, hauptsächlich holzbewohnender, Discomyceten zu ihrem Substrat. *Hedwigia* 46:25-56: figs. 7. 1906.

²¹ WILLIS, J. C., The flora of Ritigala, an isolated mountain in the north-central province of Ceylon; a study in endemism. *Annals Roy. Bot. Gard. Peradeniya* 3:271-302. 1906.

²² JUEL, H. O., Einige Beobachtungen an reizbaren Staubfäden. *Bot. Stud. tillägn. F. R. KJELLMAN* 1-20. l. 1. Upsala. 1906.